

Volume 25

Study G-I

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for
KENAI PENINSULA/LOWER COOK INLET ANGLER
USE AND STOCK ASSESSMENT STUDIES

By

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RESEARCH PROJECT SEGMENT

State: Alaska

Name: Sport Fish
Investigations
of Alaska

Project: F-9-16

Study No: G-I

Study Title: INVENTORY AND
CATALOGING

Job No: G-I-C

Job Title: Kenai Peninsula/Lower
Cook Inlet Angler Use
and Stock Assessment
Studies

Cooperators: Joe Wallis and Stephen Hammarstrom

Period Covered: July 1, 1983 to June 30, 1984

ABSTRACT

Relative growth and survival rates, determined by fall gill-netting, are presented for rainbow trout, Salmo gairdneri Richardson, coho salmon, Oncorhynchus kisutch (Walbaum), Dolly Varden, Salvelinus malma (Walbaum) and chinook salmon, Oncorhynchus tshawytscha (Walbaum), captured in area managed lakes. Pertinent historical data regarding stocking, size, time, densities and catch rates are also presented for various stocked lakes.

Creel census activities from June 1 through September 30 on the Kenai River downstream from Skilak Lake resulted in an estimated 135,883 man-days of effort being expended to harvest 21,102 coho salmon. In addition, 5,515 sockeye salmon, Oncorhynchus nerka (Walbaum), 3,706 rainbow trout, and 11,649 Dolly Varden were taken by anglers from June through September. Although creel census data were also used to estimate a harvest of 15,534 chinook salmon, this report does not cover that fishery.

A creel census was conducted on Anchor River from August 13 through October 30, 1983 to assess the harvest and effort directed toward Dolly Varden, pink salmon, Oncorhynchus gorbuscha (Walbaum), coho salmon and steelhead trout. Total angler effort and harvest of Dolly Varden and coho salmon declined from 1982 estimates. This decline is partially attributed to the late entry of coho salmon into the stream.

Inclined plane traps and minnow traps were employed to capture juvenile salmonids from May 4 through October 26, 1983. Because of low water, the inclined plane trap was an ineffective sampling device. Minnow traps were effective in sampling rearing coho and chinook salmon.

However, minnow traps did not capture significant smolt of any species. It is not known if minnow traps were selective toward smaller fish or if the low numbers captured reflects a less than average smolt out-migration.

A resource survey of marine waters of the outer Kenai Peninsula was conducted from July 25 through July 29, 1983 in cooperation with the Commercial Fish Division. Fish were sampled with an automatic jigging machine and sport tackle. Results of this survey are presented.

KEY WORDS

Anchor River, coho salmon, creel census, Kachemak Baystocked lakes, Kenai River, steelhead trout.

BACKGROUND

Stocked Lake Evaluation

Since statehood, an ongoing program to provide angling opportunities in easily accessible lake waters has utilized artificially reared or transplanted fish. Survey data have been analyzed with regard to: (1) need for additional angling opportunity; (2) potential of a given water to sustain desired species; (3) status, condition and composition of existing populations; and (4) requirements for rehabilitation or enhancement.

Historically, rainbow trout and coho salmon have been the predominant species used for stocking. Sockeye salmon and Arctic grayling have also been used when these species are available. In 1981, chinook salmon were planted in a landlocked lake to ascertain the potential of this species to the program.

During the past few years, the State has been trying to develop its own native brood stock of rainbow trout. The Swanson River on the Kenai Peninsula was selected as the donor stream. The program has been plagued with various problems until 1982 when sufficient numbers of young fish were available to meet the stocking requirement of this area. Between 1978 and 1981, only five lakes were stocked with rainbow trout. Between 1982 and 1983, a total of 15 lakes have been stocked with these fish.

Stocked populations are sampled each fall and the data obtained are used to determine relative survival, growth rate and future stocking densities. In addition, data gathered are forwarded to researchers in the Matanuska Valley where work evaluating native Alaskan rainbow trout brood stock is being conducted.

Kenai River Creel Census

The creel census on the Kenai River was initiated in 1974. Initially, the target species was chinook salmon; however, information gathered the

first year demonstrated that anglers shifted their emphasis from chinook salmon to coho salmon after the chinook salmon season closed (July 31).

The fishing techniques also change from those primarily of a drift fishery to those of a stationary bait or casting fishery. Although most anglers still use boats, they usually run to a favorite spot, anchor and fish with either roe or lures. In 1981 there were significant numbers of anglers who used a trolling technique termed "tadpollying" which consists of trolling a deep diving lure by holding the boat stationary in the current. Fishing continues through September unless poor weather or high or low water levels prevail.

The coho salmon run into the Kenai River is comprised of two segments, early and late. The early run enters the stream in late July, peaks in early August and is present until late August. The late run usually enters in late August and is present until freezeup, with peak fishing occurring in mid-September.

Prior to 1978, both runs were harvested commercially, primarily by the set net fishery occurring on the eastern shores of Cook Inlet (statistical areas 244-20, 30, 40). A decision by the Board of Fisheries in 1978 set the commercial closing date in this part of Cook Inlet at August 15.

In 1978, legislation was passed giving subsistence priority use of fishery resources. Prior to 1978, a small subsistence fishery had taken place along the east side of Cook Inlet. The fishery grew to nearly 600 household permits in 1980. In the spring of 1981, the Board of Fisheries closed the subsistence fishery. However, a court decision overruled the Board and the Department was ordered to conduct a fishery in the fall of 1981. No gill net fishery was conducted in 1982. The Board of Fisheries reopened the coho salmon gill net fishery in 1983 under the personal use category. A local sportfishing group filed for and was granted a temporary injunction allowing only one effective 24-hour period in 1983.

Anchor River Creel Census

Anchor River has long been recognized as one of the most popular sport fishing streams on the Kenai Peninsula. The river supports good populations of Dolly Varden, chinook and coho salmon. It also has the largest steelhead trout population of the five Kenai Peninsula streams which produce this species.

Observations indicated a substantial increase in angler effort and harvest on the river and, during the period 1978-83, a creel census of the summer-fall sport fishery was conducted to obtain data on harvest and population levels of Dolly Varden, coho salmon and steelhead trout.

Anchor River Life History Studies

During the course of an ongoing life history study of steelhead trout in Anchor River, juvenile salmonids were captured in various locations in

the watershed. Fish of all species were captured, thereby providing an opportunity to obtain basic life history data for other species in addition to steelhead. These data will provide a better understanding of the fish stocks and ultimately lead to better management techniques.

Kenai Peninsula Marine Survey

The major sport fishing effort in marine waters of the southern Kenai Peninsula is directed toward salmon and halibut. There is a substantial sport fishery for rockfish and bottomfish by boats based in Seward, but very little effort out of Homer. Public inquiries and interest on rockfish and bottomfish resources are increasing, and we need at least general information about occurrence and general abundance of these fishes throughout the area.

In addition, a relatively small fishery for chinook salmon has taken place in Kachemak Bay. Since 1977, records have been maintained regarding tagged chinook salmon.

A list of common and scientific names is presented in Table 1 and a map of the study area is depicted in Figure 1.

RECOMMENDATIONS

1. Added emphasis should be placed upon collection of life history data for coho and chinook salmon and Dolly Varden, and defining population characteristics of Dolly Varden in the Anchor River.
2. The Kenai Peninsula marine survey should be continued to supplement the existing data base on species other than salmon and halibut.

OBJECTIVES

1. To determine environmental characteristics of Juneau Lake during the fall and evaluate the recreational potential of the marine waters of southern Kenai Peninsula during July.
2. To determine harvest and angler effort on the Anchor River for Dolly Varden and coho salmon from August 1 through October 15 and on the Kenai River for coho salmon from August 1 through September 30.
3. To evaluate application of fishery restoration measures on 15 stocked lakes during September and October.
4. To assist in the investigation of public access status and make recommendations for acquisition or reservation of access sites to recreational fishing waters and to provide for protection of these waters.

Table 1. List of Common Names, Scientific Names and Abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
Chinook salmon	<u>Oncorhynchus tshawytscha</u> (Walbaum)	KS
Chum salmon	<u>Oncorhynchus keta</u> (Walbaum)	CS
Coho salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Sockeye salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Dolly Varden	<u>Salvelinus malma</u> (Walbaum)	DV
Lake trout	<u>Salvelinus namaycush</u> (Walbaum)	LT
Rainbow trout	<u>Salmo gairdneri</u> Richardson	RT
Steelhead trout	<u>Salmo gairdneri</u> Richardson	SH
Arctic grayling	<u>Thymallus arcticus</u> (Pallas)	GR
Round whitefish	<u>Prosopium cylindraceum</u> (Pallas)	RWF
Threespine stickleback	<u>Gasterosteus aculeatus</u> Linnaeus	TS
Black rockfish	<u>Sebastes melanops</u> Girard	BR
Canary rockfish	<u>Sebastes pinniger</u> (Gill)	CAR
Copper rockfish	<u>Sebastes caurinus</u> Richardson	COR
Dusky rockfish	<u>Sebastes cileatus</u> (Tilesius)	DR
Puget Sound rockfish	<u>Sebastes emphaeus</u> (Starks)	PSR
Quillback rockfish	<u>Sebastes maliger</u> (Jordan and Gilbert)	QR
Redstripe rockfish	<u>Sebastes proriger</u> (Jordan and Gilbert)	RSR
Silvergray rockfish	<u>Sebastes brevispinus</u> (Bean)	SGR
Yelloweye rockfish	<u>Sebastes ruberrimus</u> (Cramer)	YER
Kelp greenling	<u>Hexagrammos decagrammus</u> (Pallas)	KG
Ling cod	<u>Ophiodon elongatus</u> Girard	LC
Pacific cod	<u>Gadus macrocephalus</u> Tilesius	PC
Pacific halibut	<u>Hippoglossus stenolepis</u> Schmidt	H

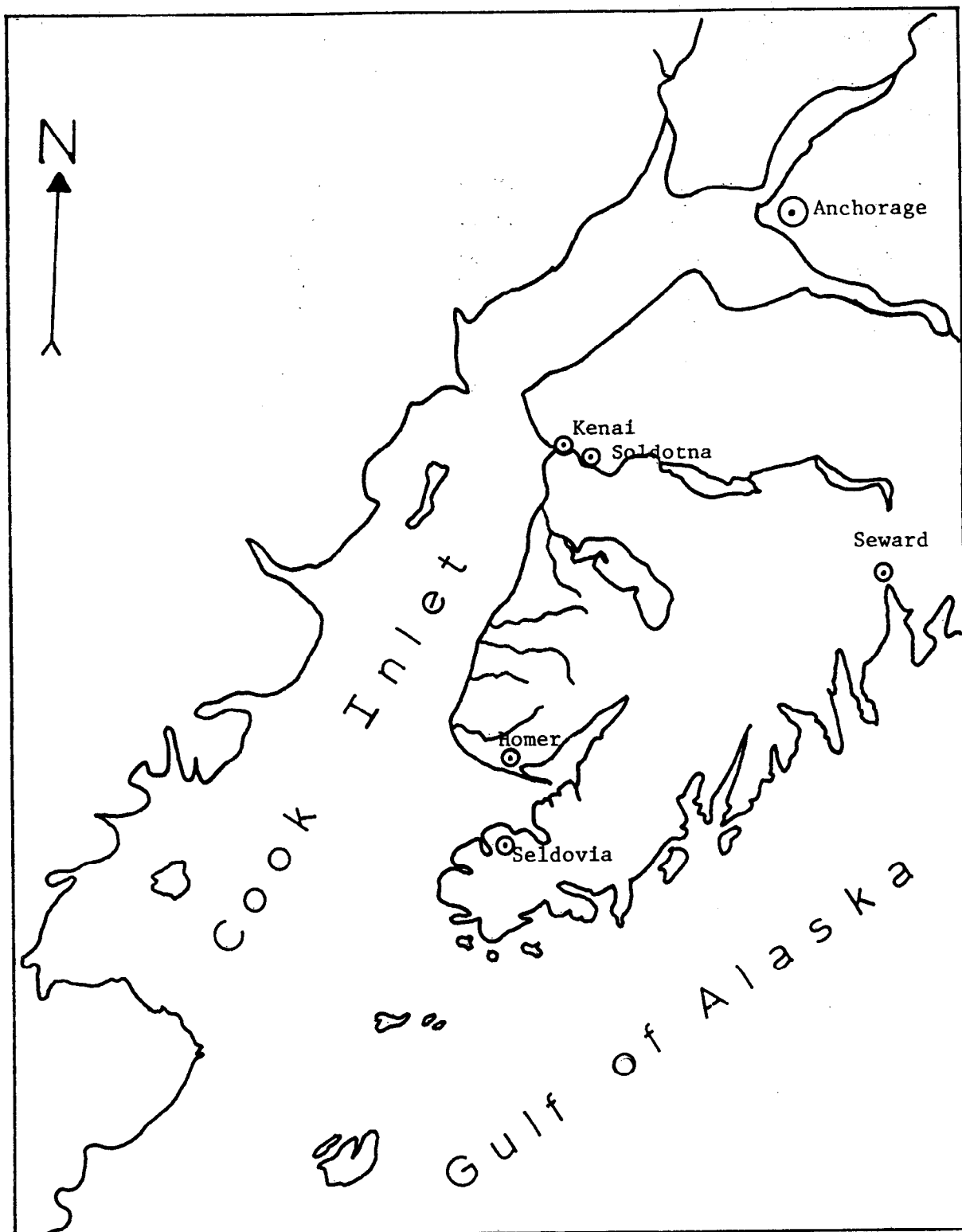


Figure 1. Vicinity map showing location of the study area.

5. To investigate, evaluate and develop plans for potential enhancement of coho salmon, rainbow trout and Dolly Varden in the Kenai and Anchor River drainage from May through September.
6. To provide recommendations for the management of sport fish resources of the area and direct the course of future studies.

TECHNIQUES USED

Stocked Lake Evaluation and Lake Survey

The techniques for evaluating the stocked lakes were the same as those described by the Lake and Stream Manual, ADF&G (1971), Engel (1973) and Hammarstrom (1974).

Kenai River Creel Census

The creel census employed on the Kenai River was based on the techniques described by Neuhold and Lu (1957) and described in detail by Hammarstrom (1977).

Effort estimates were based on two randomly selected instantaneous angler counts per day. Every weekend/holiday and 3 of 5 weekends were sampled. Because of changing daylight hours, the fishing day ranges from 20 hours to 12 hours as follows: June and July, 20 hours; August, 16 hours; September, 12 hours. During each of the interview periods, the following information was collected: hours fished, catch by number and species, whether guided or unguided, and specific biological data from chinook salmon, coho salmon and large rainbow trout.

The Kenai River coho salmon run is comprised of two distinct segments, termed early run and late run. Certain Alaska Board of Fisheries policies pertain to these run segments; therefore, effort and harvest were calculated separately for early run and late run fish in upstream and downstream sections of the river. Previous unpublished data have shown the uncensused section of the river accounts for 9.2% as much as the two census areas. The separation date between early and late run was determined by analyzing catch rates and size of fish captured, then adjusted to the closest weekly period.

Anchor River Creel Census

The Anchor River creel census was conducted during the period of August 16 through October 31, 1983. Methods employed were described in detail by Wallis and Hammarstrom (1979).

Anchor River Life History Studies

Juvenile chinook and coho salmon and Dolly Varden were captured in an "inclined-plane" downstream migrant trap, a fyke net and several minnow

traps. Fish were measured, weighed and scales removed. Scales were mounted on glass slides for later analysis. Further techniques were described in detail by Wallis and Balland (1982, 1983).

Kenai Peninsula Marine Survey

As part of an increasing demand from the recreational public, the Sport Fish Division has taken advantage of opportunities to gather information regarding the marine waters of lower Cook Inlet and Kachemak Bay.

During 1983, a cruise utilizing the State of Alaska's MV PANDALAS, a 68' research vessel, was made to that portion of the Kenai Peninsula waters bordering the Gulf of Alaska. This reconnaissance effort was a cooperative venture with the Commercial Fisheries Division of the Department of Fish and Game.

Fish were captured using automatic jigging machines using colored plastic worm jigs. In addition, sport gear (rod and reel) was also used to a limited extent. Terminal gear included, homemade jigs, "Spin-n-Glow" lures, "Pixies", "Rappalas" and cut bait.

Rockfish, Sebastes were measured for length and weight, sex was determined and otoliths were taken for age determination. Other fish were tagged and released.

FINDINGS

Stocked Lake Evaluation

Currently, 22 lakes on the Kenai Peninsula are being managed for recreational fishing utilizing artificially produced salmon and trout. Fifteen are stocked with rainbow trout of Swanson River origin, three are stocked with coho salmon, and two contain chinook salmon. In addition, two lakes are currently empty but will be stocked in early June 1984.

During the fall of 1983, fifteen lakes were sampled with gill nets; three were stocked in August, and the fish would have been too small to be tested with gill nets. Three were considered remote, and one, Rogue Lake, had a plant of only 1,500 fish.

In 1982, Scout Lake was stocked with chinook salmon fingerlings. This was the first time chinook salmon had been placed in a landlocked Kenai Peninsula lake. These fish grew rapidly and were contributing to the fishery after one growing season. Subsequent test netting results suggested few fish remained in the lake and it is suspected the majority of the fish were caught by recreational anglers. This lake will be stocked again in 1984 at approximately 300 per surface acre.

Sufficient time was not available to perform a survey on Juneau Lake during this reporting period.

Pertinent historic data regarding stocking of area lakes are presented in Table 2, while the results of the 1983 gill netting is presented in Table 3.

Kenai River Creel Census

During the 1983 census, a total of 118 instantaneous angler counts, 7,680 angler interviews, 2,233 creel checked coho salmon, and 20,710 reported angler hours were recorded. Analysis of these data resulted in an estimated harvest of 20,400 coho salmon by 36,872 anglers from August 1 through September 30. An additional 702 coho salmon were taken incidental to chinook salmon prior to August 1.

Early run fish were considered present to August 28 in the downstream section (Soldotna Bridge to Beaver Creek) and to September 4 in the upstream section (Naptowne Rapids to Skilak Lake). Late run fish were considered present from the end of the early run in the respective sections to September 30.

The early run harvest estimate of 12,851 coho salmon was slightly greater than the 1976-1982 mean of 12,380 however, the catch per hour of 0.111 represented a 17% reduction from the mean of 0.133. The overall strength of the early run was considered slightly less than average. However, because the run followed a record year in 1982, the public perceived the return to nearly normal run size as a drastic reduction and indicated their concern through numerous telephone calls during the season and testimony at the annual Board of Fisheries meeting in March.

The late run effort was estimated at 8,934 anglers, 2,773 less than the 1976-1982 mean. Catch per hour was approximately the same as the historic mean. Reduced flows in the Kenai River in late September prevented very much activity during this time when catch rates normally peak in the upstream section. The census was terminated in late September because operation without a jet unit was impractical. Mean flow during September in the Kenai River was approximately 12,500 cubic feet per second (cfs). In 1983, the stream flow had decreased to 4,800 cfs.

Graphs depicting run timing as determined by angler catch per hour per day are presented in Figures 2 and 3. Historical catch and effort data for coho salmon are presented in Table 4.

Although harvest of species other than chinook salmon and coho salmon are not accurately determined by creel census because the fishery for the species extend beyond the dates of the census, harvest for each species during the time June 1 through September 30 can give information indicating the strength of various populations. Information regarding all species is summarized in Table 5 while a historical summarization is presented in Table 6.

Anchor River Creel Census

A creel census of the fall fishery on Anchor River was conducted during the period August 13 to October 30. Estimates of effort and harvest

Table 2. Summary of Recent Kenai Peninsula Lake Stocking (1980-1983).

Lake	Date Stocked	Species	Origin	Fish/kg (lb)	Fish/Hectare (acre)	Total Stocked
Arc	5/21/81	SS	Seward, AK	684 (310)	473 (191)	3,000
	8/24/83	KS	Crooked Creek, AK	180 (82)	788 (318)	5,000
Barbara	8/30/83	RB	Swanson River, AK	788 (357)	495 (200)	9,000
Barr	9/8/82	RB	Swanson River, AK	713 (323)	412 (167)	7,000
Cabin	8/30/83	RB	Swanson River, AK	788 (357)	495 (200)	11,500
Carter	7/30/80	RB	Talarik Creek, AK	864 (376)	495 (200)	9,600
	8/30/83	RB	Swanson River, AK	788 (357)	489 (198)	9,500
Douglas	9/8/82	RB	Swanson River, AK	713 (313)	412 (167)	15,000
Engineer	5/21/81	SS	Seward, AK	684 (310)	486 (197)	45,000
	5/27/83	SS	Crooked Creek, AK	1,926 (873)	486 (197)	44,960
Island	9/8/82	RB	Swanson River, AK	713 (323)	258 (104)	28,000
	8/30/83	RB	Swanson River, AK	788 (357)	115 (46)	12,500
Jerome	9/24/81	RB	Swanson River, AK	567 (257)	454 (184)	3,000
	8/30/83	RB	Swanson River, AK	788 (357)	454 (184)	3,000
Longmere	9/8/82	RB	Swanson River, AK	713 (323)	359 (145)	25,000
Portage	6/3/82	RB	Swanson River, AK	627 (284)	449 (182)	5,000
Rainbow	9/24/81	RB	Swanson River, AK	567 (257)	495 (200)	3,000
Rogue	5/21/81	SS	Seward, AK	684 (310)	740 (300)	1,500
Scout	5/27/81	KS	Ship Creek, AK	72 (33)	312 (126)	12,000

Table 2 (cont.). Summary of Recent Kenai Peninsula Lake Stocking (1980-1983).

Lake	Date Stocked	Species	Origin	Fish/kg (lb)	Fish/Hectare (acre)	Total Stocked
Sport	9/24/81	RB	Swanson River, AK	567 (257)	840 (98)	7,000
Stormy	9/8/82	RB	Swanson River, AK	713 (323)	317 (128)	50,000
Trout	9/8/82	RB	Swanson River, AK	713 (323)	317 (128)	25,000
Tirmore	8/30/83	RB	Swanson River, AK	788 (357)	496 (202)	10,500
Upper Jean	8/30/83	RB	Swanson River, AK	788 (357)	590 (239)	11,000
Vagt	8/30/83	RB	Swanson River, AK	788 (357)	527 (213)	9,150

Table 3. Summary of Gill Net Results from Kenai Peninsula Lakes Sampled in 1983.

Lake	Species	No. Caught	Year Planted	Fork Length (mm)		Mean Weight (lbs)	Catch/Hour
				Range	Mean		
Arc	KS	1	1983	110	110	0.02	0.05
	SS	3	1981	220-290	266	0.25	0.14
Barr	RB	48	1982	172-235	212	0.12	2.04
Centennial	SS	7	1981	247-300	275	0.27	0.34
Douglas	RB	3	...	475-502	489	1.57	0.06
	RB	59	1982	106-238	191	0.09	1.26
Engineer	SS	16	1983	101-115	107	0.01	0.33
	SS	48	1981	253-350	282	0.25	1.00
Island	RB	1	...	476	476	1.46	0.02
	RB	35	1982	121-270	206	0.12	0.74
	SS	14	...	427-589	497	1.71	0.30
Upper Jean	SS	4	1981	164-395	310	0.51	0.09
Jerome	DV	21	...	158-336	234	0.16	0.95
	RB	10	1981	217-290	250	0.16	0.45
	RB	10	1983	94-118	107	0.01	0.45
Johnson	SS	19	1979	380-507	444	1.06	0.46
	SS	86	1982	167-266	196	0.09	2.10
Longmere	RB	31	1982	149-283	201	0.11	0.79
Portage	SS	1	1979	363	363	0.48	0.04
	SS	2	1982	165-218	192	0.07	0.09
Rainbow	RB	11	1981	250-360	319	0.37	0.50

Table 3 (cont.). Summary of Gill Net Results from Kenai Peninsula Lakes Sampled in 1983.

Lake	Species	No. Caught	Year Planted	Fork Length (mm)		Mean Weight (lbs)	Catch/Hour
				Range	Mean		
Scout	RB	11	1981	384	384	0.73	0.03
Sport	RB	1	1978	495	495	1.39	0.02
	RB	48	1981	214-414	294	0.31	1.00
Stormy	DV	4	...	250-530	430	0.90	0.09
	RB	8	...	349-514	450	1.27	0.17
	RB	7	1982	133-282	190	0.09	0.15
	KS	5	...	110-390	292	0.48	0.11

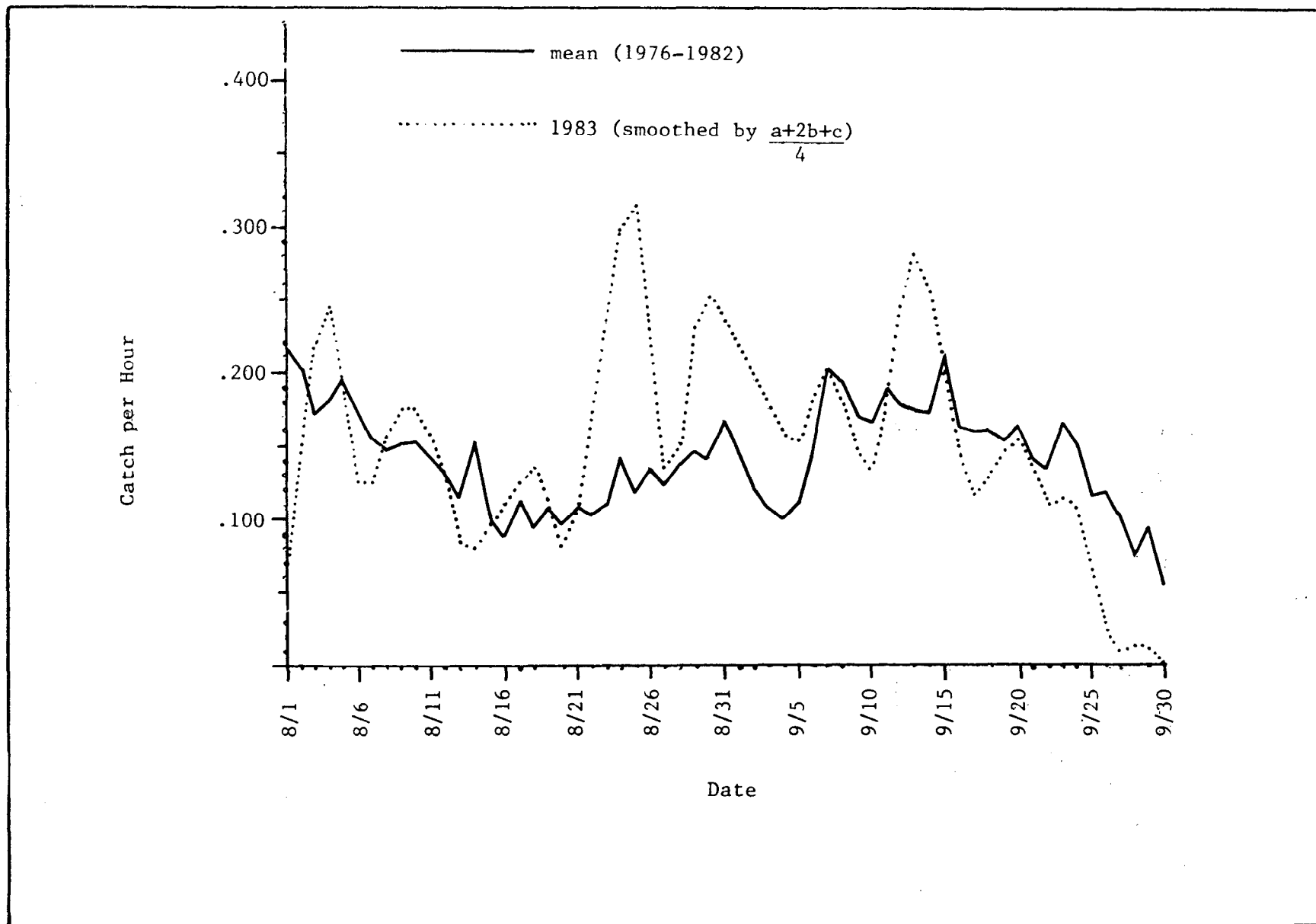


Figure 2. Catch perhour by date in the recreational fishery for coho salmon in the Kenai River (downstream Section), 1983 vs. 1976-82 mean.

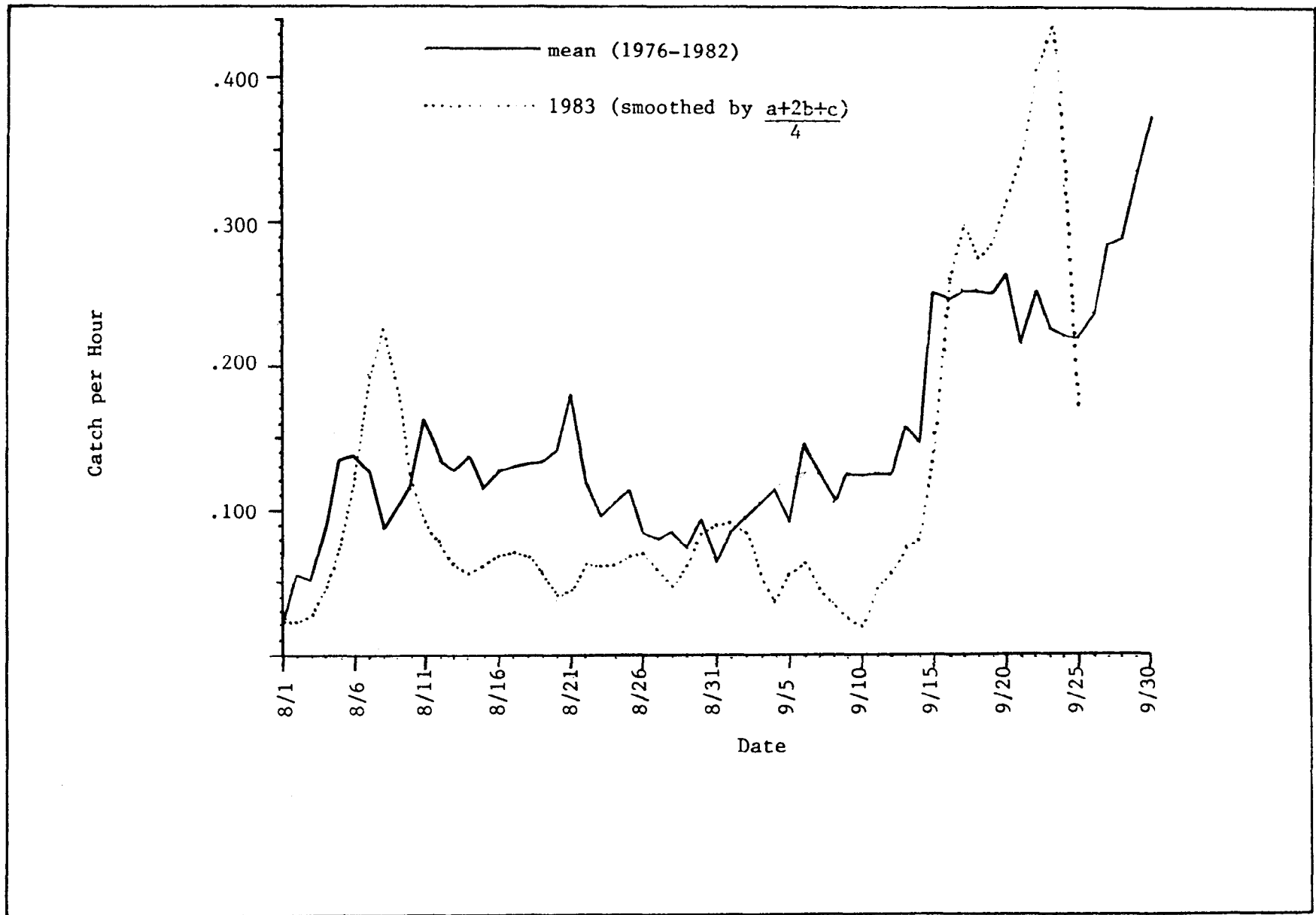


Figure 3. Catch per hour by date in the recreational fishery for coho salmon in the Kenia River (upstream section), 1983 vs. 1976-82 mean.

Table 4. Historical Data from Kenai River Coho Salmon Fishery, 1976-1983.

Year	Early Run				Late Run			
	Harvest	Effort Man-Hours	Effort Man-Days	Catch Per Hour	Harvest	Effort Man-Hours	Effort Man-Days	Catch Per Hour
<u>UPSTREAM</u>								
1976	1,625	22,042	5,511	.074	1,445	10,742	3,069	.135
1977	3,349	24,046	5,465	.139	898	6,020	1,281	.149
1978	800	22,193	4,932	.036	1,788	12,869	3,677	.139
1979	1,831	23,562	4,284	.078	2,003	16,427	4,323	.122
1980	4,670	30,582	8,751	.153	4,665	16,586	4,739	.281
1981	4,719	36,392	8,768	.130	2,900	20,628	5,157	.141
1982	3,081	37,120	9,797	.083	3,286	12,307	3,419	.267
Mean	2,868	27,991	6,787	.099	2,426	13,654	3,667	.176
1983	1,993	34,141	8,503	.058	1,543	11,176	2,483	.138
<u>MIDSTREAM</u>								
1976	1,165	12,803	3,201	.091	828	6,133	1,752	.135
1977	617	4,976	1,131	.124	198	2,087	444	.095
1978	386	6,528	1,865	.059	554	4,776	1,365	.116
1979	918	5,646	1,027	.163	290	2,423	638	.120
1980	1,319	6,376	1,824	.207	788	3,092	883	.255
1981	1,804	13,087	3,153	.138	817	6,472	1,618	.126
1982	2,778	21,703	4,682	.128	1,494	6,553	1,820	.228
Mean	1,284	10,160	2,412	.130	710	4,505	1,217	.154
1983	1,083	9,747	2,354	.111	636	3,897	753	.163

Table 4 (cont.). Historical Data from Kenai River Coho Salmon Fishery, 1976-1983.

Year	Early Run				Late Run			
	Harvest	Effort Man-Hours	Effort Man-Days	Catch Per Hour	Harvest	Effort Man-Hours	Effort Man-Days	Catch Per Hour
<u>DOWNSTREAM</u>								
1976	4,921	49,862	12,466	.099	3,240	23,977	6,851	.135
1977	3,449	30,711	6,980	.112	1,275	16,883	3,592	.076
1978	4,050	49,725	11,050	.081	4,302	39,668	11,334	.108
1979	8,373	39,205	7,128	.214	1,217	10,489	2,760	.116
1980	9,679	40,262	11,520	.240	4,092	17,769	5,077	.230
1981	8,157	57,064	13,749	.143	2,947	25,690	6,423	.115
1982	18,968	109,011	27,359	.174	8,571	42,222	11,728	.203
Mean	8,228	53,691	12,893	.152	3,664	25,243	6,823	.140
1983	9,775	71,085	17,081	.138	5,370	31,187	5,698	.172
<u>TOTAL</u>								
1976	7,711	84,707	21,178	.091	5,513	40,852	11,672	.135
1977	7,415	59,733	13,576	.124	2,371	24,990	5,317	.095
1978	5,236	78,446	17,847	.067	6,644	57,313	16,376	.116
1979	11,122	68,413	12,439	.163	3,510	29,339	7,721	.120
1980	15,568	77,220	22,095	.203	9,545	37,447	10,699	.255
1981	14,680	106,543	25,670	.138	6,664	52,790	13,198	.126
1982	24,827	167,834	41,838	.148	13,351	61,082	16,070	.219
Mean	12,380	91,842	22,092	.133	6,800	43,402	11,707	.152
1983	12,851	115,693	27,938	.111	7,549	46,260	8,934	.163

Table 5. Harvest and Effort by Month as Determined by Creel Census from the Kenai River, 1983.

Month	Effort Man-days	Chinook Salmon	Sockeye Salmon	Coho Salmon	Rainbow Trout	Dolly Varden	Total Harvest	Total Catch Per Hour
<u>Downstream Section</u>								
June and July	70,187	13,796	468	564	480	1,243	16,551	.052
August	17,081	0	41	9,775	180	228	10,224	.142
September	5,698	0	0	5,370	128	67	5,565	.178
Total	92,966	13,796	509	15,709	788	1,538	32,340	.077
<u>Midstream Section</u>								
June and July	7,605	1,157	417	59	208	371	2,212	.070
August	2,354	0	48	1,083	73	463	1,667	.171
September	753	0	0	636	31	63	730	.187
Total	10,712	1,157	465	1,778	312	897	4,609	.102
<u>Upstream Section</u>								
June and July	21,219	581	4,061	79	1,785	3,787	10,293	.145
August	8,503	0	480	1,993	609	4,808	7,890	.231
September	2,483	0	0	1,543	212	619	2,374	.212
Total	32,205	581	4,541	3,615	2,606	9,214	20,557	.177
<u>Total</u>								
June and July	99,011	15,534	4,946	702	2,473	5,401	29,056	.069
August	27,938	0	569	12,851	862	5,499	19,781	.171
September	8,934	0	0	7,549	371	749	8,669	.187
Total	135,883	15,534	5,515	21,102	3,706	11,649	57,506	.099

Table 6. Harvest by Species by Year from June 1 through September 30 from the Kenai River, 1976-1983.

Year	Effort (man-days)	Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Rainbow Trout	Dolly Varden	Total Harvest	Catch Per Hour
1976	80,056	6,031	719	13,224	21,443	1,797	4,957	48,171	0.156
1977	102,203	7,321	1,436	9,786		2,474	8,058	29,075	0.088
1978	118,307	7,120	3,180	11,880	17,011	3,118	11,695	54,004	0.121
1979	126,585	8,295	1,907	14,632		3,100	11,764	39,698	0.090
1980	103,460	5,554	1,862	25,213	7,415	1,541	5,965	47,550	0.121
1981	97,010	9,810	3,181	21,344		3,338	11,635	49,308	0.115
1982	147,398	10,276	3,797	38,178	9,202	2,589	5,291	69,333	0.117
1983	135,883	15,534	5,515	21,102		3,706	11,649	57,506	0.097
Mean	113,863	8,743	2,700	19,420	13,768	2,708	8,878	54,765 <u>1/</u> 43,897 <u>2/</u>	0.126 0.098

1/ even year

2/ odd year

during this period are listed in Table 7, and a summary of creel census data for several years is presented in Table 8.

Coho salmon did not enter the Anchor River in the same time pattern observed in recent years. During most years, the majority of the coho salmon enter the stream during mid-August. In 1983, a substantial number of coho salmon remained in the lower intertidal area and moved upstream during the first two weeks of September.

Relatively small numbers of coho salmon were caught by anglers during early and mid-August, and as a result of poor catch rates, angler effort declined. During the first three full weeks of the creel census, angler effort was only 48% as great as the effort expended during a comparable period in 1982. Coho salmon harvest during the same period was only 27% of the 1982 level.

Two hundred twenty-eight Dolly Varden were tagged with serially-numbered Floy tags during the period July 11-16. Only five tags were recovered from anglers.

Scales from 31 adult coho salmon caught by anglers were used for age determination. The length frequency of the sample is listed in Table 9 by age class and sex. In the sample, 12.9% were Age 1.1, 83.9% were Age 2.1 and 3.2% were Age 3.1.

Life History Studies

Juvenile salmonids were captured in various trapping devices during the period May 4 through October 26, 1983 as part of a steelhead life history study (Wallis and Balland, 1984). Coho salmon, chinook salmon and Dolly Varden juveniles were captured in the traps, and provided information on size and distribution of these species. Numbers of juveniles captured at the different locations are listed in Table 10, and location of the trap sites is shown in Figure 4.

In earlier years the inclined plane trap (Station 1) has been very effective in capturing both chinook and coho salmon juveniles. During 1983 this trap was not effective in capturing fish of any size or species. Low water flows and changes in the stream channel contributed to this ineffectiveness.

Adequate numbers of juveniles were captured and measured at Stations 2 and 4 to provide information on their size distribution by time. There were no noticeable differences in size of fish captured at these two stations. The size distribution of juvenile chinook and coho salmon captured at Station 4 were selected for illustration (Tables 11 and 12).

The minnow traps were effective in capturing small size coho and chinook salmon, but very few smolts were captured at any station. It is not known if the small number of smolts reflected low abundance, or if the minnow traps were selective in capturing small fish.

Table 7. Estimated Sport Fishing Effort and Harvest from Anchor River by Species and Weekly Intervals, August 13 October 30, 1983.

Week Ending	Effort Man-Hours	Estimated Harvest				
		DV	PS	SS	SH	Other
8/14	1,055	0	0	65	0	0
8/21	1,752	52	0	64	7	6
8/28	2,278	83	11	162	12	7
9/4	3,666	50	9	196	56	14
9/11	2,683	3	0	88	61	0
9/18	2,238	13	0	25	72	0
9/25	1,986	29	0	6	63	0
10/2	1,752	65	0	6	34	0
10/9	2,495	440	0	0	59	0
10/16	1,288	432	0	0	19	0
10/23	1,713	466	0	0	22	0
10/30	<u>917</u>	<u>274</u>	<u>0</u>	<u>0</u>	<u>28</u>	<u>0</u>
Total	23,823 ^{1/}	1,907	20	612	433	27

^{1/} Completed anglers fished an average of 3.44 hours per day; total effort equals 6,941 man-days.

Table 8. Summary of Creel Census Data from Anchor River for Harvest of Dolly Varden, Coho Salmon and Steelhead Trout.

Year	Period Covered In Census	Effort Man-Days	Dolly Varden		Coho		Steelhead	
			Harvest	Total Run	Harvest	Total Run	Harvest	Total Run
1954	5/29-10/23	3,000	4,000	11,500	395	1,700	247	511
1957	5/1-10/15	5,800	573	7,000	90	801	50	600
1960	5/7-10/2	5,300*	3,300	...	1,000	...	400	...
1968	7/6-10/19	3,045	4,352	...	1,149	...	102	...
1977	Entire year**	31,515	9,222	...	1,339	...	1,072	...
1978	Entire year**	42,671	17,357	...	1,559	...	1,754	4,132
1979	Entire year**	44,220	21,364	...	2,870	5,306	782	...
1980	Entire year**	33,272	10,948	...	2,649	...	841	2,388
1981	Entire year**	34,257	15,271	...	2,949	...	777	...
1982	Entire year**	24,709	10,375	...	2,379	...	551	...
1983***	8/13-10/30	6,941	1,907	...	617	...	433	1,762

* Effort incomplete - covers period 5/7-7/14 only.

** Effort and harvest data from statewide harvest survey.

*** Effort and harvest data incomplete - covers only period 8/13-10/30.

Table 9. Length Frequency of Coho Salmon from Anchor River, by Sex and Age Classification, 1983.

Age Classification	Males		Females		
	1.1	2.1	1.1	2.1	3.1
<hr/>					
<u>Length Interval (mm)</u>					
575 - 599		1		1	
600 - 624					1
625 - 649					
650 - 674		3	1	2	
675 - 699	1	2	2	4	
700 - 724		4		5	
725 - 749		3			
750 - 774	<hr/>	<hr/> 1	<hr/>	<hr/>	<hr/>
Number	1	14	3	12	1
Mean	675	697	670	684	610
Standard Deviation	-	45.6	13.2	34.5	-

Table 10. Summary of Numbers of Juvenile Salmonids Captured at Various Trapping Stations in Anchor River, 1983.

Station Number	Type of Trap	SH	DV	KS	SS
1	Inclined Plane	18	1	82	200
2	Minnow Traps	555	396	371	1,779
3	Minnow Traps	308	419	762	743
4	Minnow Traps	265	292	746	1,290
5	Minnow Traps	604	595	650	963
Miscellaneous Stations	Minnow Traps Seine, Gill Net, Inclined Plane Fry Trap	<u>244</u>	<u>182</u>	<u>283</u>	<u>247</u>
	Total	1,994	1,885	2,894	5,222

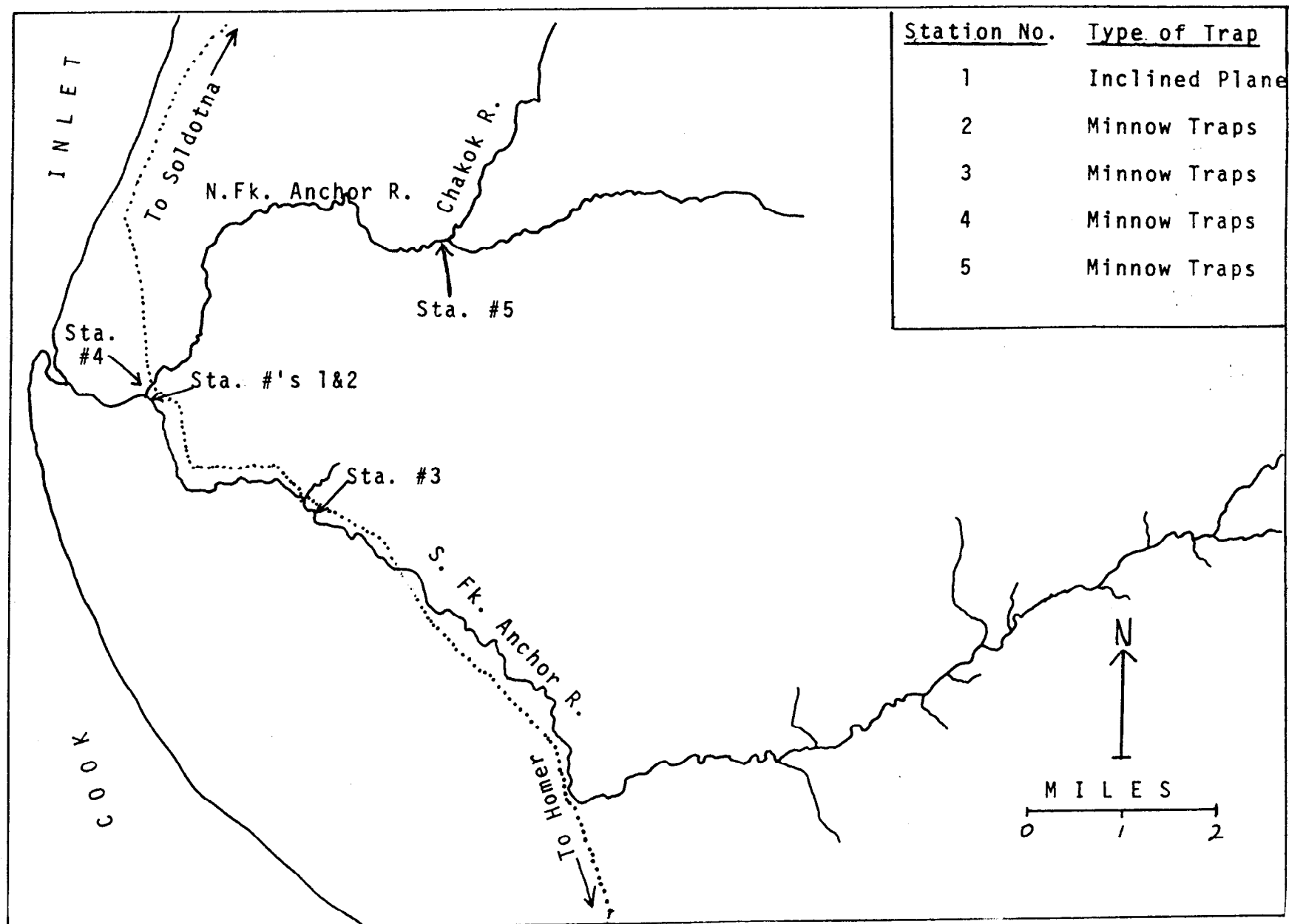


Figure 4. Map of Anchor River showing location of juvenile trapping stations, 1983.

Table 11. Numbers of Juvenile Chinook Salmon Trapped at Station 4 in Anchor River, by Weekly Period and Length Interval, 1983.

Length Interval	Week Ending																							
(mm)	5/14	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	9/3	9/10	9/17	9/24	10/1	10/8	10/15	10/22
40-44										1														
45-49					4	19			1					6		2								
50-54					1	11			6	7	1	2		3		1		1						
55-59		1				2			11	28	9	3		4	2	3	1	1				2		
60-64			1						12	54	48	19	9	12	7	4	4	2			1	1	3	2
65-69		1	1						5	38	54	24	4	20	7	1	8		1		3	4	2	3
70-74	1		2						2	20	23	13	10	20	3	1	4				1	1	1	
75-79		8	5			2			1	7	14	4	3	20			1	1				1	2	
80-84	2	1	3			1	1	2		1	2	3	4	11	1									
85-89							4	5	1	1	1			2								1		
90-94						1	6	5	5	1	1			1										
95-99								5	2		1													
100-104									1					1										
105-109										1														
110-114																								1
115-119																								
120-124																								
125-129																								
130-134																								
135-139							1																	
Total	3	11	12	0	5	36	12	17	47	159	154	68	30	100	20	12	18	5	1	0	5	10	8	6

Table 12. Numbers of Juvenile Coho Salmon Trapped at Station 4 in Anchor River, by Weekly Period and Length Interval, 1983.

Length Interval (mm)	Week Ending																						
	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	9/3	9/10	9/17	9/24	10/1	10/8	10/15	10/22
35-39										1													
40-44		1									1	3	3	3		3	3			1			
45-49		1					5	1		7	2	10	35	14	10	29	15	4		1			
50-54			1	1	1	2	24	12		4	2	10	51	32	16	50	43	9					1
55-59	1		2		2		31	30		1	1	2	20	13	4	22	36	6		1			
60-64		2	2		15	5	22	58	6	2			2	5	3	4	6	2			2		
65-69		2			12	7	11	42	13	2	2	1	4	2	1		4		1				
70-74		1			5	10	23	33	37	19	4	1	7	7		1	1						
75-79		1			2	4	13	13	41	13	2	1	5	2	2	8	4						
80-84					2	3	11	25	28	9	6	3	5	6	1	4	4		1				
85-89		1			1	1	9	12	15	7		4	1	2		1	3			1			
90-94	1						6	2	4	2	2		2	2			1						
95-99						1	1	1	1	1						1							
100-104																							
105-109								1								1	1				1		
110-114																							
115-119																	1				1		
120-124							1																
125-129																							
130-134																							
135-139																					1		
140-144																							
145-149																					1		
150-154																							1
Total	2	9	5	1	40	33	157	230	145	68	22	35	135	88	37	124	122	21	2	4	6	1	1

Kachemak Bay Feeder Chinook Salmon

We have been collecting data from tagged feeder chinook salmon caught in the Kachemak Bay sport fishery since 1977. Four marked chinooks were reported in 1983. One fish, caught near Anchor Point in June, originated from a plant in Halibut Cove Lagoon. This is the first reported catch of a chinook salmon of local origin which has been caught in the open waters of Kachemak Bay. The other three fish originated at two Oregon hatcheries (Table 13).

Kenai Peninsula Marine Survey

A resource survey of the marine waters in the Outer District of the Kenai Peninsula was conducted during the period July 25-29. The trip was made aboard the R/V PANDALUS, and the survey was conducted in cooperation with the Commercial Fisheries Division's bottomfish biologist. A map of the area covered in the survey is presented in Figure 5, and the approximate sites of sampling are noted.

The majority of fish were captured by use of automatic jigging machines being tested by the Commercial Fisheries Division. Limited effort was spent with sport rod and reel in the same areas. The species and numbers of fish caught are listed in Table 14.

Automatic jigging machines were rigged with colored plastic worm jigs. Successful sport terminal tackle included homemade jigs, Spin-n-Glows, Pixies, Rappalas and bait. Rockfish were sampled for length, weight, sex and otoliths were removed. Eight ling cod were weighed and measured, then tagged and released.

Table 13. List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery, 1977-1983.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
1977	Lgth-Weight Unknown	2-3-2	1973	Puntledge River Hatchery, British Columbia; hatchery evaluation.
9/26/78	680 mm/5.9 kg	9-5-7	1975	South Santiam River, Oregon; hatchery experimental.
9/26/78	575 mm/3.7 kg	2-4-11	1975	Nitinak River, British Columbia; wild stock contri- bution.
9/26/78	570 mm/3/6 kg	2-1-10	1975	Atnarko River, British Columbia; wild stock contri- bution.
9/30/78	825 mm/6.8 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/19/78	Lgth. Unknown 2.3 kg	63-16-6	1976	Skagit River, Washington; wild stock contribution.
3/5/79 <u>1</u> /	505 mm	4-16-16	1976	Crystal Lake Hatchery, Petersburg, Alaska.
5/6/79	Lgth. Unknown 1.6 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
9/9/79	Lgth. Unknown 6.8 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/6/79	760 mm/10 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/23/79	Lgth-Weight Unknown	2-16-30	1976	Robertson Creek Hatchery, British Columbia.
5/23/80	Lgth. Unknown 12.2 kg	2-16-30	1976	Robertson Creek Hatchery, British Columbia.

Table 13 (cont). List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery, 1977-1983.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
6/7/80	Lgth-Weight Unknown	63-16-62	1976	Preist Rapids, Columbia River, Washington.
9/-/80	Lgth-Weight Unknown	7-12-32	1977	Marion Forks Hatchery, North Santiam River, Oregon
5/13/81	Lgth. Unknown 6.4 kg	3-16-21	1977	Little Port Walter Hatchery, Alaska; NMFS experi- mental Unuk River stock.
5/13/81	Lgth. Unknown 11.3 kg	2-16-28	1976	Nitinat Lake, British Columbia; wild stock contri- bution.
5/27/81	Lgth-Weight Unknown	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
9/27/81	Lgth. Unknown 5.4 kg	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
10/3/81	Lgth-Weight Unknown	2-17-32	1978	Atnarko Hatchery, British Columbia.
7/1/82	Lgth. Unknown 5.4 kg	7-30-22	1978	South Santiam River Hatchery, Oregon.
8/15/82	Lgth. Unknown 5.9 kg	4-19-38	1978	Deer Mountain Hatchery, Ketchikan, Alaska.
6/-/83	Lgth-Weight Unk. Unknown	4-20-32	1980	Halibut Cove Lagoon, Alaska. Direct saltwater release.
9/18/83	Lgth-Weight Unk.	7-25-18	1980	McKenzie River Hatchery, Oregon.

Table 13 (cont). List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery, 1977-1983.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
9/24/83	Lgth-Weight Unk.	7-25-17	1980	McKenzie River Hatchery, Oregon.
9/25/83	Lght-Weight Unk.	7-22-2	1979	Bonneville Hatchery, Oregon.

1/ This individual caught in an experimental shrimp trawl.

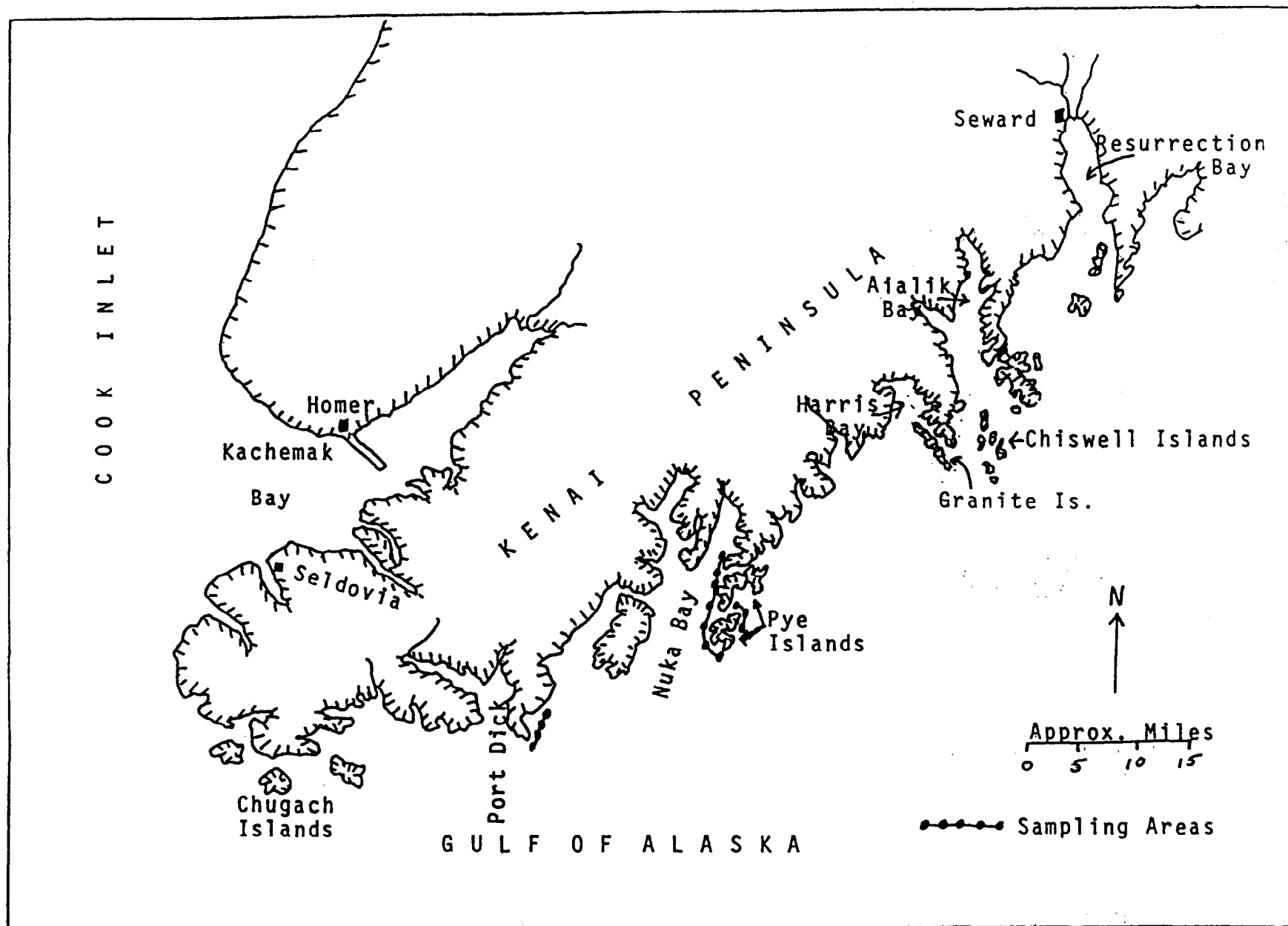


Figure 5. Map of Lower Kenai Peninsula showing location of Rockfish Sampling Survey, 1983.

Table 14. Species and Numbers of Fish Caught During Survey of Outer
Kenai Peninsula, July 25-29, 1983.

Species	Number
Black Rockfish	97
Canary Rockfish	1
Copper Rockfish	1
Dusky Rockfish	126
Puget Sound Rockfish	1
Quillback Rockfish	4
Redstripe Rockfish	6
Silvergray Rockfish	5
Yelloweye Rockfish	2
Kelp Greenling	3
Ling Cod	10
Pacific Cod	27
Pacific Halibut	<u>7</u>
Total	290

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